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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/549,569

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Leonard Rexberg

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NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER

GHULAMALI, QUTBUDDIN

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/549,569	Applicant(s) REXBERG, LEONARD	
	Examiner Qutbuddin Ghulamali	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 8-13, 15 and 17-25 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 8-13, 15, 17-18, 21-24 is/are rejected.
- 7) ☒ Claim(s) 19, 20 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/19/05, 9/2/08, 12/8/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to amendment filed 12/8/2008.

Response to Remarks/Amendment

2. Applicant's remarks/amendment filed 12/3/2008 with respect to amendment to claims 1-4, 6, 8-13, 15, 17-25 have been fully considered but they are not persuasive. Applicant's amendment of the claim with the inclusion of limitation "means for compensating for changes in at least one predetermined parameter , wherein the parameter represents amplifier temperature". Applicant's attention is most respectfully drawn to Ding wherein Ding discloses this feature by recognizing that with a so-called memory-less assumption nonlinear power amplifier distortion is only dependent on the instantaneous input power or signal amplitude supplied to the amplifier. However, this assumption is only valid to a limited extent. A number of factors may contribute to the presence of a memory effect in power amplifiers, such as junction temperature or capacitance, drain bias decoupling network, reflection from output mismatches, etc. Ding further discloses inclusion of a memory-less circuit such as fig. 3A that can be modified to incorporate memory to address the other factors such as temperature effects, etc., as shown with respect to figs. 4A, 4B, 5 and 6, where the memory effect can be compensated for using the pre-distortion techniques of Ding's (page 3, section 0041). As per the disclosure in Ding of aforementioned limitation, rejection to follow is made.

Specification

3. The disclosure is objected to because of the following informalities: On page 4 in the applicant's amendment to the specification, filed 12/8/2008, is in error. The amendment to the specification for paragraph beginning at page 3, line 19, states "Fig. 6 is a diagram illustrating sampling of polynomials in accordance". It is not clear in what in accordance means.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-4, 8-13, 17-18 are rejected under 35 U.S.C. 102 (e) as being anticipated by Ding et al (US Pub. 2003/0223508).

Regarding claims 1, 10, Ding discloses a power amplifier pre-distorter formed by a discrete-time filter structure (a memory FIR filter is disclosed) with filter taps, comprising:

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an individual look-up table (a number of lookup tables) for each filter tap, each look-up table representing a sampled polynomial in a variable representing signal amplitude (signal gain) (page 1, section 0012, 0013; page 2, sections 0025, 0028, 0029); means for selecting (tap values are selected with search algorithm), from each filter tap look-up table, a filter coefficient that depends on the amplitude of a corresponding complex signal value to be multiplied by the filter tap (page 3, section 0032, 0037; page 4, section 0044, 0047, 0048, 0049, 0051, 0052; page 5, sections 0055, 0056; page 6, section 0069, 0070, 0073); and means for compensating for changes in at least one predetermined parameter, wherein the parameter represents amplifier temperature [Ding discloses this feature by recognizing that with a so-called memory-less assumption nonlinear power amplifier distortion is only dependent on the instantaneous input power or signal amplitude supplied to the amplifier. However, this assumption is only valid to a limited extent. A number of factors may contribute to the presence of a memory effect in power amplifiers, such as junction temperature or capacitance, drain bias decoupling network, reflection from output mismatches, etc. Ding further discloses memory-less circuit such as fig. 3A can be modified to incorporate memory to address the other factors such as temperature effects, etc., as shown with respect to figs. 4A, 4B, 5 and 6, where the memory effect can be compensated for using the pre-distortion techniques of Ding's] (page 3, section 0041).

Regarding claims 2, 3, 4, 11, 12, 13 Ding discloses the discrete-time filter structure comprises a FIR filter structure (page 4, sections 0048, 0049).

Regarding claims 8, 17 Ding discloses other factors such as drain bias parameter in transistors or transistor junction that can be compensated using pre-distortion techniques of the invention (page 3, section 0041, lines 8-21).

Regarding claims 9, 18 Ding discloses means for selecting, from each filter tap look-up table, a filter coefficient that depends on the instantaneous signal power of a corresponding complex signal value to be multiplied by the filter tap (page 3, section 0041).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103 (a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 6, 15, 21-24 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Ding et al (US Pub. 2003/0223508) in view of Leyendecker et al (USP 5,923,712).

Regarding claims 6, 15, 22, Ding discloses all limitations of the claim above except does not explicitly disclose parameter represents average pre-distorter signal power. However, Leyendecker discloses a scheme that incorporates average envelope power of parameter for pre-distorter (abstract, col. 12, lines 1-11, 62-67; col. 13, lines 1-11, 24-40). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use parameter represent average power as taught by

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Leyendecker in the circuit of Ding because it can provide proper parameter match and minimize processing time.

Regarding claim 21, the steps claimed as method is nothing more than restating the function of the specific components of the apparatus as claimed above and therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to represent the claim in an alternate way so as to realize steps of the method as claimed, considering the aforementioned rejection for the apparatus claim 1, 10.

Regarding claim 23, Ding discloses other factors such as drain bias parameter in transistors or transistor junction that can be compensated using pre-distortion techniques of the invention (page 3, section 0041, lines 8-21).

Regarding claim 24, Ding discloses means for selecting, from each filter tap look-up table, a filter coefficient that depends on the instantaneous signal power of a corresponding complex signal value to be multiplied by the filter tap (page 3, section 0041).

Allowable Subject Matter

8. Claims 19, 20, 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutbuddin Ghulamali whose telephone number is (571)-272-3014. The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QG.

March 10, 2009.

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611